REMARKS

In the last Office Action, the Examiner rejected claims 1-6 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Publication No. 2002/0050565 A1 to Tokuda et al. ("Tokuda").

In accordance with the present response, the specification has been suitably revised to correct informalities, provide antecedent basis for the claim language, and bring it into better conformance with U.S. practice. Original claims 1-6 have been replaced with new claims 7-26 to further patentably distinguish from the prior art of record, improve the wording, bring the claims into better conformance with U.S. practice, and provide a fuller scope of coverage. The title of the invention has been changed to "APPARATUS FOR PROCESSING AND OBSERVING A SAMPLE" to more clearly reflect the invention to which the new claims are directed. A new, more descriptive abstract has been substituted for the original abstract.

Applicants respectfully request reconsideration of their application in light of the following discussion.

Brief Summary of Invention

The present invention is directed to an apparatus for processing and observing a sample. As described in the specification (pages 1-9), conventional apparatuses for

processing and observing a sample have been difficult to operate because of interference between a wafer sample stage and a test sample holder disposed in a sample chamber. While it has been proposed to increase the space within the sample chamber to prevent interference between the wafer sample stage and the test sample holder, such increase of the space of the sample chamber is impractical because it increases the overall size of the apparatus. This renders the apparatus bulky and causes problems during evacuation of the interior of the sample chamber.

The present invention overcomes the drawbacks of the conventional art. Figs. 7, 8A and 8B show an embodiment of an apparatus for processing and observing a sample according to the present invention embodied in the claims. The apparatus has a sample stage 6 for supporting a sample 7 at a preselected location thereof. A focused ion beam irradiation system 2 is provided for irradiating the sample 7 with a focused ion beam along an optical axis to cut out a portion 17 (e.g., a test sample) from the sample 7. A side entry stage 3 is disposed over the sample stage 6 and extends slantingly with respect to the optical axis of the focused ion beam irradiated by the focused ion beam irradiation system 2. The side entry stage 3 has a microscope sample holder 40 (e.g., a TEM sample holder or a SEM sample holder) for picking up the cut-out sample portion 17 directly from the preselected

location of the sample 7 and for supporting the sample portion 17. The microscope sample holder 40 is configured to be removed from the side entry stage 3 while supporting the sample portion 17 and to be connected to an entry stage of a microscope device (e.g., a TEM or SEM device) for observing the sample portion. Preferably, the sample portion 17 is picked up and supported by a needle 41 removably connected to an end of the microscope sample holder 40.

Thus the apparatus according to the present invention provides a microscope sample holder which functions as both a manipulator for picking up the cut-out sample portion directly from a preselected location of the sample and as a holder for supporting the sample portion during observation of the sample portion with a microscope device. By this construction, the apparatus does not require a probe or manipulator for picking up the sample portion and a separate holder for supporting the sample portion during observation by a microscopic device. As a result, the overall size of the apparatus does not become bulky as compared to the conventional art. Furthermore, since the side entry stage extends slantingly with respect to the optical axis of the focused ion beam irradiated by the focused ion beam irradiation system, interference between the microscope sample holder and the sample stage is effectively prevented.

The prior art of record does not disclose or suggest the subject matter recited in newly added claims 7-26.

New independent claim 7 is directed to an apparatus for processing and observing a sample and requires a sample stage for supporting a sample at a preselected location thereof, a focused ion beam irradiation system for irradiating the sample with a focused ion beam along an optical axis to cut out a portion from the sample, and a side entry stage disposed over the sample stage and extending slantingly with respect to the optical axis of the focused ion beam irradiated by the focused ion beam irradiation system, the side entry stage having a microscope sample holder for picking up the cut-out sample portion directly from the preselected location of the sample and for supporting the sample portion, and the microscope sample holder being configured to be removed from the side entry stage while supporting the sample portion and to be connected to an entry stage of a microscope device for observing the sample portion.

The prior art of record does not disclose or suggest the structural and functional combination of the apparatus recited in independent claim 7. For example, Tokuda discloses an apparatus for processing a micro sample. As shown in Figs. 19-20, the apparatus has a vacuum container 206, a sample stage disposed in the vacuum container and supporting a sample 217, a focused ion beam irradiation system for irradiating a focused ion beam 227 on the sample 217 to cut out a sample piece 232, a probe or manipulator 203 for picking up the

sample piece 232 from the sample, and a side entry sample stage 242 having a sample holder 233a for supporting the sample piece 232. After the probe 203 is manipulated to pick-up the sample piece 232 from the sample, the probe 203 is driven by a probe moving mechanism 201 and a probe position controller 223 and the sample piece 232 is attached to the sample holder 233a of the side entry sample stage 242. The side entry sample stage 242 is then extracted from the vacuum container 206 and mounted on TEM apparatus to carry out TEM observation. See paragraph [0121] in Tokuda.

Thus Tokuda does not disclose or suggest a side entry stage having a microscope sample holder for picking up the cut-out sample portion directly from the preselected location of the sample and for supporting the sample portion, the microscope sample holder being configured to be removed from the side entry stage while supporting the sample portion and to be connected to an entry stage of a microscope device for observing the sample portion, as recited in claim 7. Stated otherwise, claim 7 requires a side entry stage having a microscope sample holder which functions as <u>both</u> a probe or manipulator for picking up the sample portion directly from the sample <u>and</u> as a holder for supporting the sample portion during observation of the sample portion. Tokuda does not disclose or suggest <u>a single side entry stage for performing these two functions</u>. As described above, the apparatus in

Tokuda requires a probe or manipulator 203 for picking up the sample piece 232 from the sample and a separate side entry sample stage 242 having the sample holder 233a for supporting the sample piece 232 during observation thereof.

New independent claim 21 is directed to an apparatus for processing and observing a sample and requires a sample chamber, a sample stage disposed in the sample chamber for supporting a sample, a first focused ion beam irradiation system for irradiating the sample with a focused ion beam along an optical axis to cut out a portion from the sample, and a side entry stage disposed over the sample stage and extending slantingly with respect to the optical axis of the focused ion beam irradiated by the first focused ion beam irradiation system, the side entry stage having a removable sample holder for supporting the sample portion. Claim 21 further requires a second focused ion beam irradiation system for irradiating the sample portion with a focused ion beam while the sample portion is supported by the sample holder, and a single focused ion beam lens barrel having the first and second focused ion beam irradiation systems.

The prior art of record also does not disclose or suggest the structural and functional combination of the apparatus recited in independent claim 21. For example, the apparatus disclosed by Tokuda has two lens barrels each having a focused ion beam irradiation system. In contrast, claim 21

requires a single focused ion beam lens barrel having two focused ion beam irradiation systems.

Claims 8-20 and 22-26 depend on and contain all of the limitations of independent claims 7 and 21, respectively, and, therefore, distinguish from the prior art of record at least in the same manner as claims 7 and 21.

In view of the foregoing amendments and discussion, the application is now believed to be in condition for allowance. Accordingly, favorable reconsideration and allowance of the claims are most respectfully requested.

Respectfully submitted,

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MAILING CERTIFICATE

I hereby certify that this correspondence is being deposited with the United States Postal Service as first-class mail in an envelope addressed to: MS NON-FEE AMENDMENT, COMMISSIONER FOR PATENTS, P.O. Box 1450, Alexandria, VA 22313-1450, on the date indicated below.

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Name

Debra Buonincontri
Signature

September 16, 2004
Date

IN THE DRAWINGS:

Submitted herewith are replacement sheets for Figs. 6 and 9 incorporating revisions in Fig. 6 to change "31" to "31′" and in Fig. 9 to label the deflection system with numeral 23 to conform to the written description in the specification.